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ABSTRACT

By the age of 4, children typically have separate schema for relating events in the physical world and for relating events to associated mental states. Generally, these schema cannot be coordinated until around 6 years of age, when the ability to use them together yields a structure for assigning intentionality. This intentional structure develops until by adolescence the capacity exists for interpreting personal/character traits and history. These social structures develop throughout early and middle childhood and adolescence and are subject to societal processing constraints. To determine variations in development across cultural and class lines, a comparison was undertaken of performance in story composition and identification by middle socio-economic status (SES) children in Canada, the United States, and Japan and low-SES children in North America. While little difference was found in central social structure for the middle-SES groups in the three countries, low-SES group performance on tasks measuring central intentional structure was considerably below that of the middle-SES subjects. This difference might stem from differences between middle and low SES parent language usage, with middle groups using questions to have children display known information (similar to standard classroom questioning) and treating events in a decontextualized manner, thus aiding the development of children's intentional structure. (Charts of cognitive structures, tables, and 31 references are included.) (BCY)

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ED 361 121

Using the Notion of a Central Conceptual Structure to Explain the Development of Children's Understanding of Human Behaviour

Paper presented at the biennial meeting of the
Society for Research in Child Development
1993

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Running Head: Children's Understanding

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As was noted in the first paper, central conceptual structures are thought to occupy a middle ground between the general knowledge structures proposed by Piaget and the more-recently proposed domain-specific structures proposed by information processing theorists such as Chi & Rees (1983) and Siegler(1981), having domain-general and domain-specific properties. In terms of general properties, they are thought (a) to have a wide, yet delimited range of application, (b) to be subject to system-wide processing constraints, and (c) to be central to children's development. On the domain-specific side, they are thought (a) to apply to only one domain, albeit a broad one, (b) to be comprised of a set of unique cognitive operations, and (c) possibly to vary across cultures. Central numerical and spatial structures, having these properties were described in the second and third papers. In the present paper, I will outline a third structure, which applies to the social domain and which has similar domain-general and specific properties.

Research has shown that a well-established schema for dealing with social situations is in place by 4 years of age. For example, Nelson (1981) demonstrated that 4-year-olds possess scripts for common events, such as eating at MacDonald's or going to a birthday party. These scripts are comprised of temporally-ordered, stereotypic actions and events and enable children to relate events in a coherent fashion. Similarly, work in early narrative composition has demonstrated that 4-year-olds can generate coherent stories, comprised of states, actions and events that temporally, causally, and referentially bound (Mandler & Goodman, 1982; Stein & Glenn, 1979)). The following sample story, told by Lucy in response to a request to "tell a story about a happy little girl and a kind old horse," typifies 4-year-olds' narratives in that it is action/event based and reports only those actions that occur within the story world (Case & McKeough, 1990; McKeough, 1992a):

Once upon a time there was a girl who lived on a farm with a very good horse and she always rode to the country on the horse and they had a picnic together.

Four-year-olds appear to use the same action/event schema when explicitly asked to account for the actions of another person in a social context. Goldberg-Reitman (1992) asked young children to predict and account for a mother's nurturing actions when her little girl was in danger of injury. Cartoons depicting a child in problem situations were shown and read to 4-year-olds (e.g., a little girl slipping off a roof), and they were asked what the girl's mother would do and why. Even at this young age, the children predicted a reasonable course of action, (e.g., "The mom will catch her.") and explained the mother's actions in terms of the action event (e.g., "...because she's falling off."). Thus, it seem clear that 4-year-olds possess an *action event schema*, comprised of descriptions of states and events that map onto states and events in the physical world (see Figure 1), which is used in a range of tasks, including reporting on common, real-life events, composing fictional narratives, and accounting for a mother's nurturing behaviour.

[Insert Figure 1 about here]

In a slightly different vein, researchers who study the child's "theory of mind" have demonstrated that, by 4 years of age, children's knowledge of mental states has also begun to develop. For example, Wellman (1988) demonstrated that pre-schoolers (a) acquire mental state terms such as *forget, dream, pretend, believe, and know*, (b) appreciate the difference between mental states and objective reality (e.g., that dreaming about *x* is different that seeing *x*), (c) understand that individuals can hold different mental states (e.g, a gift giver might *know* that a wrapped box contains a *x* but the receiver might *think* it contains *y*, and (d) understand the relation between these mental states and people's action.

It has also been demonstrated that pre-schoolers understand the relation between affective states and action. Bruchkowsky (1992) determined that, when shown a video tape of a young girl happily playing with her dog, followed by a sequence in which the child tearfully reports that a car has hit her dog, 4-year-olds can identify the child's affective state (i.e., "sad") and explain it in terms of an action event (e.g., "... because the car hit him."). Further evidence of the affect-action/event link was provided by Griffin (1992). When she asked 4-year-olds to define feeling terms, such as happy and sad, they reported, for example, that "happy was getting a birthday present" and "sad was when you're crying." Thus, from this and other research (e.g., Fischer & Pipp,1984; Fischer, Shaver, & Carnochan, 1990; Stein & Levine, 1986), it appears that pre-schoolers (at least those from middle, class Western, "schooled" families), have, in addition to the afore described action/event schema, a fairly well established schema for relating internal cognitive and affective states to external events and actions (see Figure 2).

[Insert Figure 2 about here]

By the time children have passed their sixth birthday and enter school, we typically see a marked change in the use of these two knowledge structures. Unlike the 4-year-olds, who seem to use either one or the other of these structures, 6-year-olds coordinate the two with the result that action sequences often contain reference to the mental states that underlie them or are associated with them. The following story sample composed by Amanda illustrates this point:

Once upon a time there was a little girl. She - she was walking to go and pick some flowers. But when - but when she was picking some flowers she heard a buzzing noise and up came a big bee. She was scared and she ran home and she - and she came back and - with her big sister... And she didn't know what to do, but her sister explained that bees make honey and she shouldn't be ascared.

In her story, Amanda laid out a sequence of actions (i.e., a little girl walks to pick flowers, a bee comes, she runs home, etc.). But in addition, she makes explicit reference to associated cognitive and affective states (i.e., "she was *scared,"* "she doesn't *know ...,"* and "... she shouldn't be *ascared").* By relating external events and actions to the character's internal mental states (i.e., her thoughts and feelings), Amanda produced a simple version of Bruner's (1986) "dual-landscape" narrative. That is, she has generated both a landscape of action (comprised of events, states, and actions) and the beginnings of a landscape of consciousness (comprised of "... what the protagonist knows, feels, thinks, or believes" about the landscape of action. p. 12).

As Figure 3 demonstrates, the dual landscape notion seems to capture the flavour of the 6-year-old story structure quite well. The story is comprised of a setting (i.e., a girl is walking to pick flowers) from which an initiating event emerges, serving to start the action rolling ("she hears a buzzing noise and up comes a big bee"). The initiating event causes affective disequilibrium (i.e., fear), graphically depicted as , which sets a balance-restoring initiative or plan in motion (i.e., elicit her big sisters help). The idea yields an action response (i.e., although the little girl doesn't know what to do, her big sister explain that bees make honey) which, in turn enables affective equilibrium to be reestablished . Thus, a set of causal relations is represented between the external world of physical states and action, on the one hand, and the internal world of feelings and mental states (i.e., ideas or plans), on the other. We have termed the 6-year-old structure *intentional* narrative because the intentions of the characters motivate the action (e.g., I do "x" and "y" because I know, think, or feel "a" and "b"). In the intentional structure, one could say that the landscape of consciousness is both differentiated from and coordinated with the landscape of action.

[Insert Figure 3 about here]

If this integrated intentional structure is a central one, however, it should be utilized beyond the story domain. We should see intentional reasoning in the responses of the 6-year-old group on those tasks for which its component schemata were utilized by the 4-year-olds. Indeed, we found evidence that 6-year-olds also used the intentional structure when answering questions pertaining to the actions and feelings of others. On the cartoon task developed by Goldberg-Reitman, they explained that a mother would catch a little girl "... because she didn't *want* her to get hurt." Thus, in contrast to the 4-year-olds, whose responses remained on the landscape of action (e.g., "... because she's sliding off the roof"), the 6-year-olds made additional reference to mother's mental state or intention to account for her actions.

Similarly, on Bruchkowsky's (1992) video task, 6-year-olds explained that the girl would feel sad when the car hit the dog "... because she *loved* him" or "... because she was going to *miss* him" and that the video made them feel "sad because I like dogs too." Recall that this reference to the "landscape of consciousness" was absent in the answers of the younger children, who explained the girl's feelings exclusively in action terms (e.g., "...because the dog went on the road."). Evidence that 6-year-olds use an integrated intentional structure also came from their responses on Griffin's definition of feelings task (1992). They reported that "happy is when you *feel* happy because your mom plays with you" and "sad is when you cry because no one *likes* you." The central intentional structure is presented in Figure 4. As can be seen, it is comprised of the action/state description mapped onto physical-world action and states, which, in turn, are associated with internal mental states.

[Insert Figure 4 about here]

At 8 years of age, further development in the intentional structure is evident. On narrative tasks 8-year-olds introduce a second focus in their stories, a complication of a series of unsuccessful attempts at resolution, prior to the solution, whereas 10-year-olds typically integrate the complication in the resolution, with the result that the story has a well- developed feeling and planned quality. Thus, children articulate an increasingly elaborate set of mental states and intentions associated with the action in the story, as the following prototypic story, composed by a 10-year-old, illustrates:

Once upon a time there was a little girl. She was very sad because she didn't have a pet. One day one of her father's -- father's sheep had a little goat and it was going to die because she had lots of others and it couldn't get enough milk. She wanted it so badly. And then her father finally gave up and gave it to her. She was very happy. After that she always lived with it and was always happy with it . She took very good care of it and was very happy with it. Then one day a ram came and he was -- the little girl was inside eating her supper. The ram came along and killed the little goat and ate it. She -- Finally she came out and she saw the little goat was dead -- had been taken away. She was very sad. Her father went out and bought her another little lamb and she lived happily ever after.

In this story, the initial problem (i.e., the girls lack of a pet) frames the story and serves as a focal point about which the two other sets of story events revolve (i.e., the initial plight of the little goat at birth and the subsequent tragic events that befall it). Giving the two characters complementary needs and desires (i.e., the girl's desire for a pet and the little goat's need for nurturing) makes the event sequences "natural" companions. This integration is also evident in other intentionally-based tasks, namely Goldberg-Reitman's cartoon task and Bruchkowsky's video task. On both, 10-year-olds explain behaviours in terms of integrating intentions that provide an overarching context for actions and more immediate mental states. For example, they explain that the girl's mother will save the little girl (action) because "she doesn't want her to

be hurt (immediate mental state) ... because mothers care for their children" (overarching intention).

By adolescence further changes in social structure occur. Overall, reasoning about social interaction takes a decidedly psychological turn. For example, work by Henderson and Case (1993) has shown that by about 12 or 13 years of age surprise endings are used to give events a "double meaning." As Figure 5 shows, narratives proceed along an intentional vein, outlining physical-world states and events and the mental states of the characters that are associated with them. One meaning is constructed by the reader at this level. The generation of a surprise ending, however, causes the reader to reflect back on the story and to ascribe a second meaning to it. In other words, the surprise ending leads to an alternate interpretation. My own work (McKeough, 1987, 1991) has demonstrated that adolescents also use flashback in their narratives, thereby placing the characters intentions in a long-term context and establishing character traits that endure across time and situations. The flashback causes events happening in the present to be interpreted differently; current events are interpreted in the light of past events (see Figure 6). For example, the reader is shown that a character feels "a" and "b" because past experiences have influenced the type of person the or she is. Thus, rhetoric devices, such as flashback and surprise endings, allow the reader to interpret the intentional states of story characters and mark a shift in the quality of the productions from *intentional* narratives to *interpretive* ones.

[Insert Figures 5 and 6 about here]

The interpretive structure might well be used in additional domains, such as history. For example, students who reach an understanding of why the parents of Romeo and Juliet forbade the marriage can be expected to comprehend why the Jesuits thought that the Huron and Algonquin nations were uncivilized (McKeough, 1991). In both cases, students take, as the "object" of their cognition, the mental states of the target groups (i.e., what they thought, felt, and wanted) and interpret these in light of the personal histories of the actors. In other words, both tasks require students to consider *why* the actors' perspectives developed as they did.

By way of summary thus far, before entering school, children have separately constructed both a schema for relating events and action that occur in the physical world and a schema for relating events and their associated mental states (see Figure 7), which they utilize to make sense of a wide range of situations. Moreover, although pre-schoolers use one or the other of these schemata is a range of tasks, they were typically unable to use them in a coordinated fashion, as was the case with the 6-year-olds. The coordination of the two yields a broadly utilized *intentional* structure, where reciprocal causal relations exist between the unfolding action in the external world and changing mental states in the character's internal world (see Figure 7). By 8 and 10 years of age, further elaboration of the intentional structure is evident. By contrast, the interpretive approach of adolescents allows us to examine why characters have the intentions they do, that is, intentions are explained in terms of, for example, characters' psychological traits or personal history (again, see Figure 7). It would seem, then, that qualitatively distinct social structures are constructed throughout early and middle childhood and adolescence and that they have a wide, yet delimited range of application. Further, the hierarchical developmental progression suggests that the structures are subject to system-wide processing constrains. Finally, having a unique set of cognitive operations, the central social structures might well vary across cultures.

[Insert Figure 7 about here]

To investigate this latter possibility, we looked at children's performance across cultural and socio-economic status (SES) groups. Specifically, we studied middle SES North American (i.e.,

Canadian and American) and Japanese children as well as low SES North American children. When we looked at the the story problem themes across American and Japanese children we see that both groups tell stories about problems related to task achievement (e.g., reading or math). Perhaps not surprisingly in light of cultural stereotypes, however, the groups differed on the individual/group dimension. American children's stories tended toward an individualistic focus, dealing with issues related to an individual's problems experienced either alone or in the context of the social group (e.g., bullying). The problems identified by Japanese children dealt more with interpersonal conflict within the social group ((Okamoto, Berg, Bleiker, Henderson, Xin, Lianquin, & Case,1993) (see Table 1).

A very different picture emerges, however, when we look an the central social structure scores of the two cultural groups. As Figure 8 shows, there is very little difference between the performance of middle SES Canadian, American, and Japanese 10-year-old children on either the story composition task or the cartoon task measuring children's understanding of a mother's motives (Okamoto, Berg, Bleiker, Henderson, Xin, Lianquin, & Case,1993). A difference emerges, however, when we look at performance across SES groups. As Figure 9 shows, the performance of academically "at-risk," low SES Canadian (Godbout, 1993; McKeough, 1993) and American children (Case, Okamoto, Henderson, & McKeough, 1992) on tasks that measure the central intentional structure is well below that of their academically-average, middle SES counterparts.

[Insert Figures 8 and 9 about here]

It is interesting to speculate as to why lower SES North American children have not kept in step developmentally with their middle SES peers, in spite of cultural and school expectations, whereas middle SES Japanese children perform at an equivalent level, even though there is less emphasis placed on narrative in school settings. There is a considerable bank of literature that shows SES differences in language usage (Brice-Heath, 1988). For example, Wells (1981) has shown that middle SES parents use questioning for knowledge display purposes (i.e., I know the name of that bird, but I want to see it you know it), whereas low SES parents use it to obtain information (I don't know Billy's brother's name and I want you to tell me). It's been suggested that, because teachers' questioning is largely of the knowledge-display variety, lower SES children, who are less familiar with the process, might be at a disadvantage when they enter school. It seems reasonable to assume that (a) language factors, such as the one described above, might contribute to the lower performance of low SES children and that (b) the language usage reflects a further difference in terms of the central conceptual structures being assembled. Schooled parents might well treat social interaction in a decontextualized fashion, examining the events outside of their immediate context, differentiating physical and mental events, and holding them up separately for examination (e.g., "I know you *want* to win, but other people *want* to win to. You can't win all of the time. They have to win some of the time too."). This process might help children to construct a central intentional structure, putting them at an advantage both when dealing with the decontextualized tasks comprising our assessment battery and in school classrooms.

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Figure 1
EVENT SEQUENCE SCHEMA
(4 years)

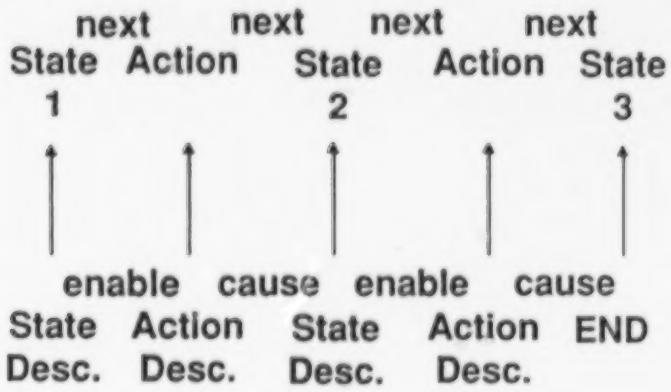


Figure 2
Mental State Schema (4 years

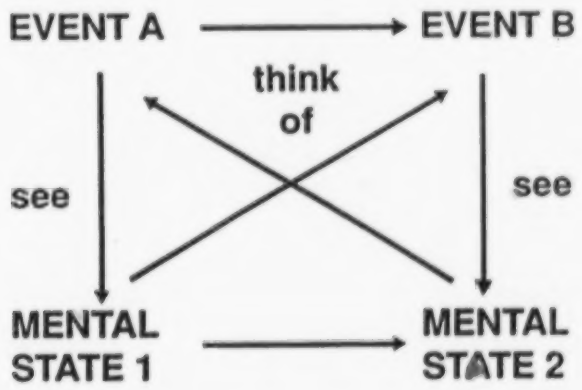


Figure 3
The Intentional Narrative Structure at 6 Years of Age

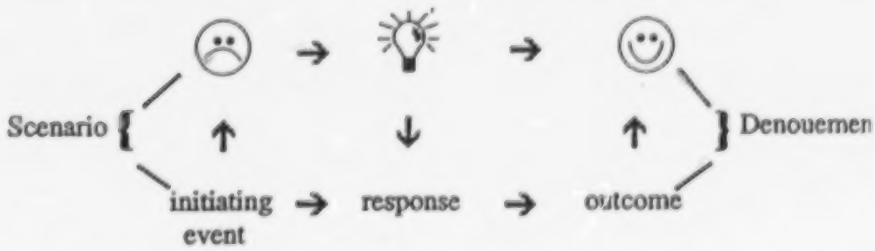


Figure 4
INTENTIONAL STRUCTURE
(4 years)

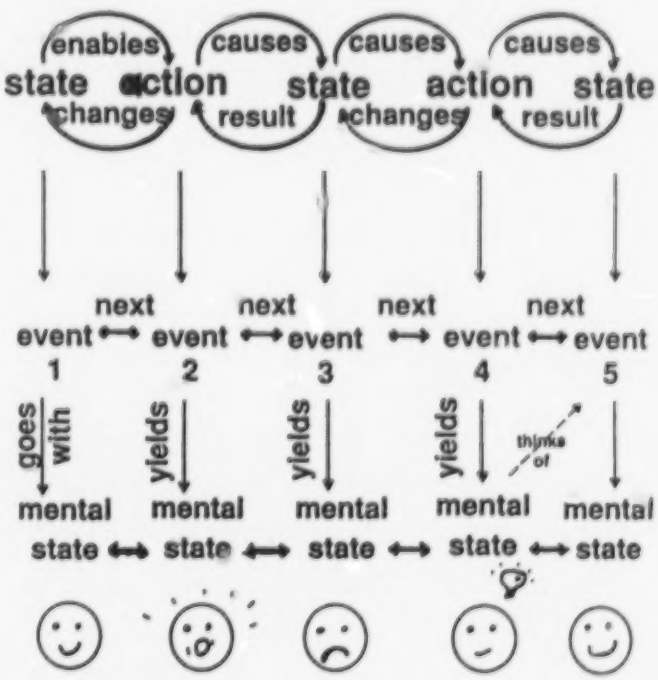
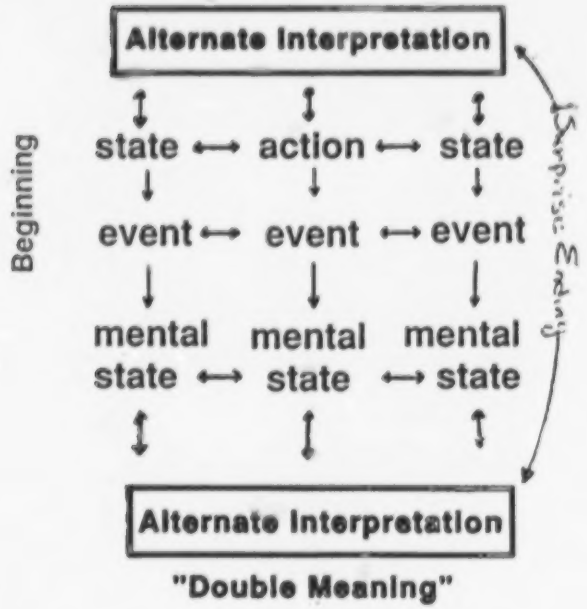


Figure 5

Adolescence → Psychological Focus

narratives: surprise ending



"Double Meaning"

Figure 6

Adolescence → narrative with flashbacks

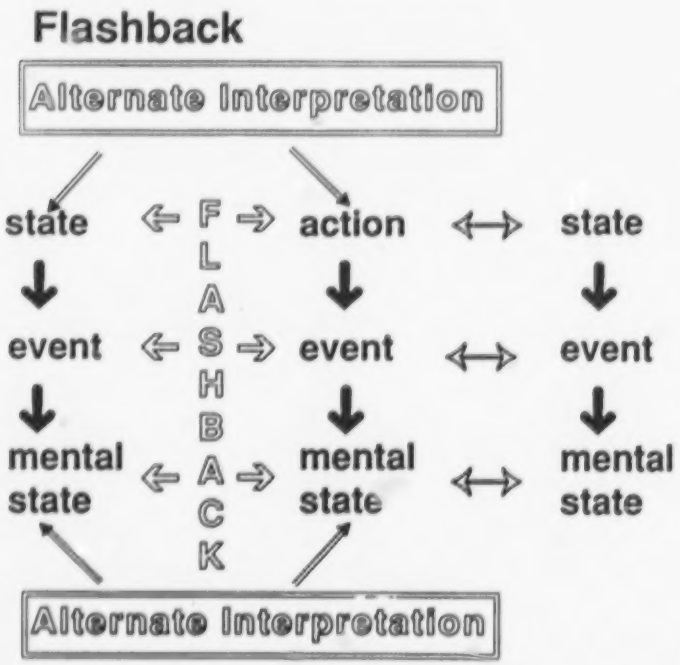

Flashback
Alternate Interpretation
state ⇐ FLASHBACK ⇒ action ⟷ state
event ⇐ FLASHBACK ⇒ event ⟷ event
mental state ⇐ FLASHBACK ⇒ mental state ⟷ mental state
Alternate Interpretation

Figure 7
Central narrative structure

	Relational Stage (2 -4 years)	Dimensional Stage (5 -11 years)	Vectorial Stage (12 -18 years)
Social Structure	Action Event Structure	Intentional Structure	Interpretive Structure
	sequence of physical events and states (I do 'A' and then I do 'B')	events and states in physical world are differentiated from but related to mental states (I do 'A' & 'B' because I feel/think 'X' & 'Y')	mental states are related to character's psychological makeup (I feel/think 'X' & 'Y' because I am a certain type of person)
Plot Structure	1st order event structure (Script)	2nd order event structure (Simple plot of folktale)	3rd order event structure (Complex plot of short story)
	time line reporting of event sequence; action and feeling are melded	episodic organization centering on a problem and its resolution; event is problematic because of the mental state it engenders	Literary techniques (e.g., foreshadowing or flashback) provide meta-perspective to characters' actions and mental states resulting in romance, satire, comedy, or tragedy

Figure 8 Cross Cultural Data

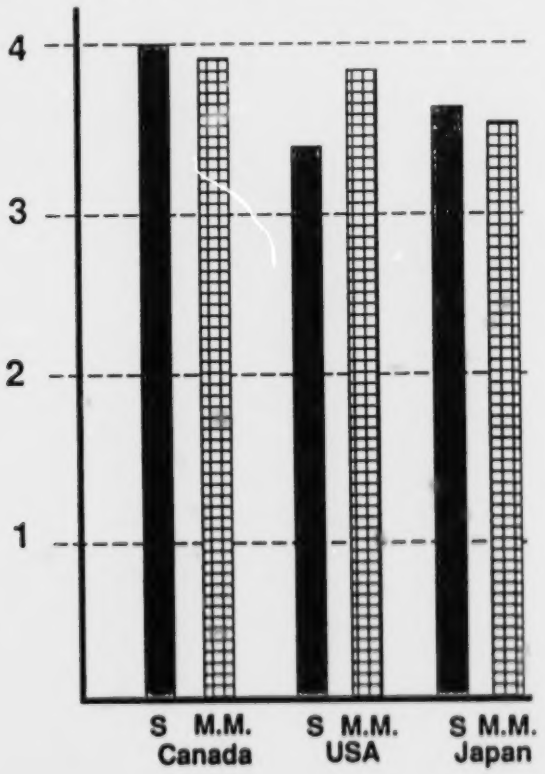


Figure 9 Comparison across SES groups - Canadian Children

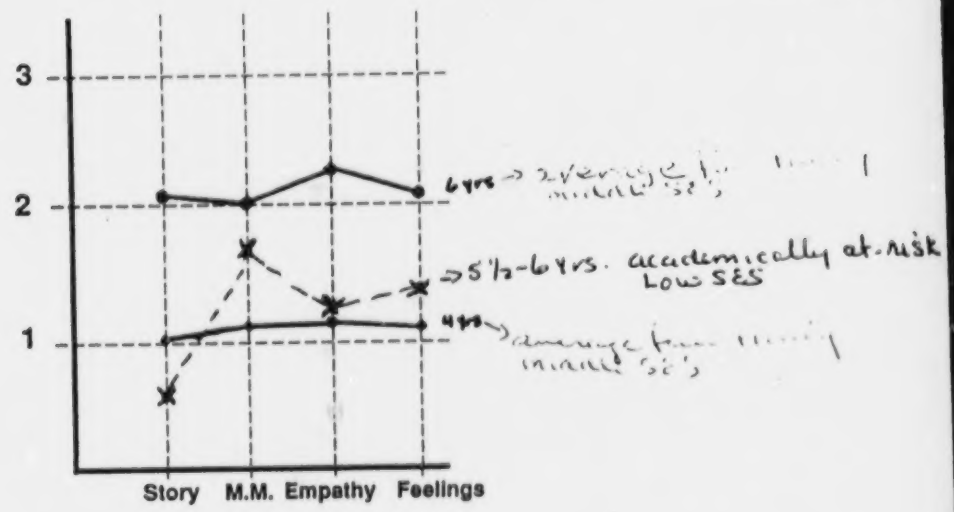


Table 1
Cross Cultural Comparison of Problem Themes

Type of Problem	USA	Japan
Interpersonal conflict within social group	4%	45%
Task achievement (reading, math)	17%	20%
Individual's problem at hands of social group (bullying, drugs)	61%	35%
Individual's problem experienced on his/her own	17%	0%

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